

# THE MINERAL INDUSTRY OF

# ZIMBABWE

By Philip M. Mobbs

In 1995, Zimbabwe was self-sufficient in most minerals, with more than 50 different mineral commodities being produced from more than 400 mines. Zimbabwe's dynamic mineral industry played a major role in the world supply of chrysotile asbestos, ferrochromium, and lithium minerals.

The mineral industry was diverse, with a nucleus of asbestos, chromite, copper, diamond, gold, and nickel operations. Gold production remained the country's leading mineral sector in 1995. Gold output exceeded 24 metric tons (t). Intense diamond exploration activity continued throughout the country.

All mining activities came under the Mines and Minerals Act (Chapter 165) (1961), its amendments, and associated regulations. All mineral rights were vested in the state through the President of Zimbabwe. Exclusive Prospecting Orders were renewable, 3-year rights to search for specified minerals in a given geographic location.

Zimbabwe promoted international tax equity to encourage foreign investment. Corporate tax levels were 37.5%, and the individual rate was 40%. Buildings, equipment, shaft sinking, and premining development could be expensed at 100% in the year of the expenditure. The Zimbabwe Investment Center (ZIC) assisted investors with permits and licenses and sanctioned investment projects. Since 1994, ZIC has approved mining projects valued at more than \$600 million.<sup>1</sup> The Government proposed privatization of Zimbabwe Mining Development Corp.'s (ZMDC) mining operations by 1997. Following that, ZMDC would become a promoter of diamond and gold mining opportunities in Zimbabwe.

The Gold Trade Act gave the Reserve Bank of Zimbabwe the monopoly on buying and selling all produced gold. The Minerals Marketing Corp. Zimbabwe handled most other mineral exports.

Under the provisions of the Mines and Minerals Act (1961), the Ministry of Mines was responsible for verifying that exploration and development operations have minimal long-term environmental impact. The Ministry of Lands, Agriculture, and Water Development monitored water pollution under the Water Act (1976) as did the Ministry of Environment and Tourism's Department of Natural Resources under the Natural Resources Amendment Act (1975). The Ministry of Health was responsible for air quality under the Atmospheric Pollution Prevention Act

(1971). The Natural Resource Board held an annual environmental conservation competition to evaluate mining companies' efforts to rehabilitate slimes and tailings disposal areas.

Most of the country's mineral industries were export-oriented and thus exposed to world market fluctuations. Many minerals were processed prior to export in accordance with the Government's strategy of increasing value-added natural resource exports. For 1995, mineral exports were valued at approximately \$731 million, which was up from \$549 million in 1994. The main mineral commodities exported in 1995 were gold (\$269 million), ferroalloys (\$242 million), asbestos (\$78 million), nickel (\$68 million), black granite (dimension stone) (\$10 million), copper (\$10 million), and diamond (\$3 million). Bulk commodities increasingly were being diverted from South African ports to Maputo, Mozambique.

Large multinationals, such as Anglo American Corp. Svc. Ltd., Lonrho Zimbabwe Ltd., and Rio Tinto Zimbabwe Ltd. (RTZ), historically have maintained a significant presence in the nation's mining industry. Recently, a number of Canadian and Australian junior mining companies have begun exploration operations in Zimbabwe, concentrating in the diamond and gold sectors.

The Government's mining company, ZMDC, had an interest in a number of mining operations. Refractory ores containing gold were treated at Zimbabwe's oldest Government-owned company, The Roasting Plant. The Reserve Bank of Zimbabwe purchased all gold produced in the country. The state's Industrial Development Corp. of Zimbabwe Ltd. had several subsidiary companies operating in the industrial mineral sector. (*See table 2.*) Mineral exports were usually shipped out of the country aboard the state-owned National Railways of Zimbabwe.

Approximately 50,000 people were employed in medium- and large-scale mining operations. An estimated 10,000 people worked the nation's small mines, and an estimated 100,000 people were involved in informal gold panning.<sup>2</sup> During 1995, there were 74 fatal mining accidents reported nationwide, compared with 34 during 1994.<sup>3</sup>

Shangani Energy Exploration of Zimbabwe was reviewing its three coalbed methane test wells. Trotter Exploration of Zimbabwe and Afpenn Exploration, a subsidiary of Afpenn Resources Ltd. of the United Kingdom, were evaluating their

coalbed methane prospect test well. Reduced demand for coke by Zisco continued to constrain operations at Wanki Colliery.

Munyati Mining Co., the operations company owned by Reunion Mining Plc. of London and the state-owned ZMDC, began mining copper oxide ore at Sanyati in May 1995 and started heap leaching in September. On the leach pad, the project used a sulfurous acid ( $H_2SO_3$ ) solution, produced on site by burning sulfur imported from South Africa. Construction of the solvent extraction and electrowinning plant had begun in September 1994, and London Metals Exchange (LME) Grade A copper was being stripped from the cathodes by November 1995. At yearend, Reunion proposed to proceed with the "CoZiMa Project," a pilot plant to recover cobalt, manganese, and zinc from the leachate. A prefeasibility study of the sulfide ore at Sanyati also was completed during 1995.

Reunion estimated Sanyati reserves at 5.8 million tons (Mt) grading 1.1% copper and 1.2% zinc for the oxides. Sulfide reserves were estimated by Reunion to be 14.2 Mt containing 1.2% copper, 3.2% zinc, and 0.9% lead. The Sanyati ore had an estimated 0.015% cobalt and 0.8% manganese content.<sup>4</sup>

Bindura Smelter & Refinery Ltd. also was producing LME Grade A copper cathode. The Siros melt furnace installed during 1995 as part of the Bindura plant modernization was used to treat copper leach residue and increased copper cathode production capacity by more than 2,000 metric tons per year (t/yr).

Much of the country was under Exclusive Prospecting Orders for diamond and at various stages of exploration. Reunion and partners worked a number of diamond prospects. Trillion Resources Ltd. of Canada and Nickelodeon Minerals Inc. of Canada were setting up a bulk sampling plant on their Sansukwe diamond prospect.

The River Ranch Mine began the third phase of its expansion. By December, the mine was producing at an annual rate of 1,500,000 t of ore, which was up from 500,000 t.

A joint venture between Zimbabwe Alloys Limited (Zimalloys), Japan Metals & Chemicals Co., and Mitsui & Co., Ltd. was formed at yearend. The joint venture would increase low-carbon ferrochrome production at Zimalloys' Gweru smelter to 40,000 t/yr.

Construction of a slag reprocessing plant at the Kwekwe smelter of Zimbabwe Mining and Smelting Co. (Pvt.) Ltd. (ZIMASCO) began at yearend. The company projected an annual production increase of 60,000 t/yr of high-carbon ferrochromium when the treatment plant comes on-line at the end of 1996.

Most of the new gold operations were based on the application of new technology to old operations. While large mines dominated the gold sector, numerous medium- and small-scale producers contributed about 10% to the nation's gold production.

Alluvial gold panning was Zimbabwe's rural alternative to subsistence farming. The Mining (Alluvial Gold) (Public Streams) Regulations (1991) authorized selective alluvial gold mining. However, the mandate was unfunded, and local authorities were unable to administer the law. Thus, most panning was on unauthorized ground, and a significant proportion of the production was smuggled out of the country. The resultant tax avoidance and extensive environmental damage that was due to riverbank erosion and stream siltation resulted in increased awareness of the activity.

Cluff Resources Zimbabwe Ltd.'s Freda Rebecca Mine was producing primarily from the Rebecca underground mine. Kinross Gold Corp. of Canada continued construction of a 3,500 metric tons per day carbon-in-leach tailings retreatment plant at the Blanket Mine near Gwanda.

Trillion Resources Ltd. of Canada and ZMDC were producing from four mines on the Jena Mines property. An exploratory drilling program on the rest of the property was underway. In addition, Trillion was exploring 11 prospects in Zimbabwe, including the Kadoma East property and the Mutare West and East project.

Oliver Gold Corp. of Canada acquired a 50% interest in Maple Leaf Mining (Pvt.) Ltd. of Zimbabwe. Maple Leaf operated the "C" and Camp gold mines. Easton Minerals of Canada acquired majority interest in the Goodenough gold mine.

Guyana Gold Corp. contracted to triple the production of the Sabi Mine to approximately 20,000 metric tons per month as ZMDC's new joint-venture partner at Sabi.

Casmyn Corp. of the United States acquired Matabeleland Minerals (Pvt.) Ltd. from the privately owned Muir group of Bulawayo. Matabeleland had several gold properties, including the Turk, Peter Pan, and Lonely Mines in the Bubi district north of Bulawayo.

Antares Mining and Exploration Corp. of Canada and the Forbes and Thompson Ltd. of Zimbabwe continued exploration on the Lady Lina property with a drilling and underground development program. Forbes & Thompson agreed to mill up to 250 metric tons per day of ore from the Lady Lina prospect at their nearby Vubachikwe mill. Antares was trenching the Black Cat prospect.

Stone Holdings (Pvt.) Ltd. and Zimrock International (Pvt.) Ltd. began construction of a granite cutting and polishing plant. Production was to be exported.

Zimbabwe Iron and Steel Co.'s (Zisco) Redcliff sinter plant was completed in March 1995 and Buchwa Iron Mining Co.'s crusher and a 15.8-kilometer (km) conveyor to carry ore from the new Ripple Creek Mine to the sinter plant were under construction. However, Zisco's blast furnace No. 4 remained shut down during 1995. A furnace renovation contract signed with an European consortium, including Davy International Stockton and Sofresid, was deferred by Zisco during November 1995.

Bindura Smelter & Refinery upgraded its Outokumpu

leach facilities at Bindura with the installation of a Sherritt Gordon pressure leach line in the nickel refinery and a Sirosmelt furnace. The additions should have improved base metal recovery rates slightly and boosted the byproduct platinum-group metals (PGM) recovery rate. Incoming ore was reduced early in the year when a shaft accident closed Bindura Nickel Corp.'s Shangani Mine for almost 2 months.

RTZ's Empress nickel refinery began the long-proposed capacity expansion program. The refinery, which toll refined copper-nickel matte from BCL Ltd.'s Selebi-Phikwe smelter in Botswana, was expanding total plant capacity from 11,500 t/yr to 16,900 t/yr. Like Bindura, Empress produced both nickel and copper metal.

ZIMASCO was processing approximately 4,000 metric ton per month of platinum-bearing ore at its Mimosa Mine pilot plant near Zvishavane.

BHP Minerals Zimbabwe, a subsidiary of Broken Hill Proprietary Co. Ltd. of Australia, and Delta Gold NL of Australia continued work at the Hartley Mine. The mine was being designed to process 2.16 million metric tons per year of ore. The Hartley platinum deposits were of lower grade than those in South Africa; however, Hartley was starting mining at a depth of only 100 meters (m). The visible 2-m thick sulfide zone contained exploitable cobalt, copper, gold, iridium, nickel, osmium, palladium, platinum, rhodium, and ruthenium.

BHP was constructing a smelter and a base metal refinery to produce nickel and copper cathode. INCO Ltd. and Johnson Matthey Ltd. won the contract to toll refine the PGM in Europe. BHP projected annual production at 4.6 t of platinum, 3.4 t of palladium, 358 kilograms (kg) of rhodium, in addition to 715 kg of gold. Also 3,200 t/yr of nickel and 2,300 t/yr of copper was expected to be recovered at Hartley.<sup>5</sup>

RTZ and Tinto Holdings Zimbabwe Ltd. sold their interests in the Mhondoro Platinum Joint Venture, located just south of the Hartley Complex. Delta increased its ownership in Mhondoro from 24% to 38.7%; and Valley Exploration and Mining Co., a subsidiary of BHP Minerals Zimbabwe, obtained the remaining 61.3%. Delta announced indicated resources of 96 Mt averaging 5.9 grams per ton (g/t) combined PGM at Mhondoro.

Delta's evaluation of its 100%-owned Selous platinum prospect showed indicated reserves of 48 Mt averaging 4.74 g/t of combined PGM. Delta continued platinum exploration on its Ngezi prospect.

ZMDC recommended that equipment from its closed Kamativi Tin Mines be dispersed to other ventures in Zimbabwe.

Most of Zimbabwe's bulk commodities were moved by rail. All major cities and industrial centers were linked to Botswana, Mozambique, South Africa, and Zambia by the National Railways of Zimbabwe's 2,745 km of track. Petroleum products destined for Zimbabwe were piped to Feruka, near Mutare, via the Beira pipeline through Mozambique, and then moved west via the Mutare-Harare

pipeline or trucked.

Zimbabwe was recovering from its recent history of foreign exchange and price controls and strict regulation of private investment. Increased availability of foreign exchange has enabled the mineral industry to replace aging plants and obsolete equipment. Given the intensity of exploration, new mineral deposits were likely to be discovered. Asbestos, coal, ferroalloys, gold, and nickel were expected to remain the mainstays of the Zimbabwean mineral economy through the turn of the century, bolstered by copper, diamonds, granite, and PGM. Updated investment regulations, the nation's well-developed and well-maintained infrastructure, and new exploration techniques were expected to encourage further local and foreign participation in the mineral industry.

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<sup>1</sup>Where necessary, values have been converted from Zimbabwe dollars (Z\$) to U.S. dollars at the rate of Z\$8.1=US\$1.00 for 1994 and at the rate of Z\$9.3=US\$1.00 for 1995.

<sup>2</sup>Chamber of Mines Journal. No End in Sight to Gold Panning. V. 36, No. 7, July 1994, p. 7.

<sup>3</sup>Chamber of Mines Journal. Mining Death Toll Reaches 74. V. 38, No. 2, Feb. 1996, p. 9.

<sup>4</sup>The Northern Miner. Ontario, Canada. Caledonia Affiliate Upgrades Zimbabwe Copper Mine. Dec. 19, 1994, p. 16.

<sup>5</sup>BHP Minerals. Minerals Global Report. Oct. 1, 1994, p. 1.

## Major Sources of Information

### Ministry of Mines

Private Bag 7709, Causeway  
Harare, Zimbabwe  
Telephone: (263) (4) 703-781  
Fax: (263) (4) 793-065

### Chamber of Mines

4 Central Ave.  
P.O. Box 712  
Harare, Zimbabwe  
Telephone: (263) (4) 707-992  
Fax: (263) (4) 707-983

### Zimbabwe Geological Survey

Mafue Bldg., 5th and Selous  
P.O. Box CY210, Causeway  
Harare, Zimbabwe  
Telephone: (263) (4) 726-342  
Fax: (263) (4) 733-696

## Major Publications

Bartholomew, D. S. Base Metal and Industrial Mineral Deposits of Zimbabwe. Zimbabwe Geological Survey Mineral Resources Series No. 22, Harare, 1990, 154 pp.

———. Gold Deposits of Zimbabwe. Zimbabwe Geological Survey Mineral Resources Series No. 23, Harare, 1990, 75 pp.

The Chamber of Mines Journal, Harare, monthly.

Mining in Zimbabwe, Thomson Publications, Harare, annual.

TABLE 1  
ZIMBABWE: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity	1991	1992	1993	1994	1995	e/
<b>METALS</b>						
Antimony, mine output, concentrate, Sb content	160	254	95	65	65	
Beryllium, beryl concentrate, gross weight	29	23	23	4	4	
Chromium, chromite, gross weight	564	522	252	517	631	2/
Cobalt: 3/						
Mine output, Co content e/	105	80	90	100	80	
Metal (hydroxide)	130	100	113	126	100	
Columbium and tantalum, tantalite concentrate, gross weight	111	94	48	7	1	
Copper:						
Mine output, concentrate, Cu content e/	14	10	9	9	9	
Metal:						
Smelter output, blister/anode, primary e/	13,830	9,690	8,200	10,000	8,000	
Refinery output, refined/cathode, primary	13,811	9,673	8,187	9,350	6,875	2/
Gold	17,820	18,278	18,916	20,512	24,344	2/
Iron and steel:						
Mine output, iron ore:						
Gross weight	1,136	1,179	375	4	311	2/
Fe content e/	660	710	225	3	160	
Metal:						
Pig iron e/	535	507	211	100	209	2/
Steel, crude	581	547	221	187	210	2/
Ferroalloys:						
Ferrosilicon	187	191	124	183	254	2/
Ferrosilicon chromium	28	20	30	36	47	2/
Ferromanganese	--	--	2,151	--	--	
Nickel:						
Mine output, concentrate, Ni content e/	12,400	11,300	12,800	15,000	11,300	
Refinery output, refined metal 4/	11,297	10,349	11,097	13,516	10,862	2/
Platinum-group metals:						
Palladium	30	19	11	17	17	
Platinum	19	9	4	7	7	
Selenium	2,549	1,736	1,113	2,009	2,000	
Silver	19,380	16,930	12,004	10,942	11,000	
Tin:						
Mine output, Sn content e/	1,060	950	800	100	--	
Smelter output, metal	796	716	657	82	--	
Tungsten, concentrate, W content e/	1	--	--	--	--	
<b>INDUSTRIAL MINERALS</b>						
Asbestos	142	150	157	152	169	2/
Barite	866	232	120	--	--	
Cement, hydraulic e/	865	900	1,000	1,000	1,100	
Clays:						
Bentonite (montmorillonite)	99,900	82,956	83,000	169,097	170,000	
Fire clay	23,304	15,954	9,257	13,997	14,000	
Kaolin	65	83	90	462	500	
Diamond	--	40,654	43,850	173,588	250,000	
Feldspar	3,820	2,696	1,553	1,617	1,600	
Gemstones, precious and semiprecious, emerald	667	46	635	276	300	
Graphite	12,903	12,346	7,142	7,890	11,381	2/
Kyanite	2,463	1,990	1,000	567	600	
Lithium minerals, gross weight	9,186	12,837	18,064	25,279	25,000	
Magnesium compounds, magnesite	23,295	8,973	6,276	1,588	8,199	2/
Mica	506	495	510	213	200	
Nitrogen, N content of ammonia e/	66,000	67,000	70,000	70,000	70,000	
Phosphate rock, marketable concentrate	117	142	153	151	144	2/
Pigments, iron oxide	400	538	390	438	400	
Stone, sand and gravel:						
Granite	79,907	90,694	40,032	106,605	110,000	
Limestone	1,428	1,366	1,036	1,658	1,700	
Quartz 5/	70	77	61	131	131	
Sulfur						
Pyrite:						
Gross weight	69,854	66,345	72,588	71,026	70,706	2/
S content e/	30,734	29,200	30,000	30,000	30,000	
Byproduct acid, metallurgical and coal process gas e/	5,000	4,500	4,000	4,500	4,500	
Talc	1,676	2,203	1,349	2,049	2,050	
Vermiculite	2,319	4,300	5,032	8,184	8,200	
Commodity	1,991	1,992	1,993	1,994	1,995	e/
<b>MINERAL FUELS AND RELATED MATERIALS</b>						
Coal, bituminous	5,616	5,547	5,285	5,515	4,919	2/
Coke, metallurgical e/ 6/	560	500	500	550	550	

See footnotes at end of table.

TABLE 1--Continued  
ZIMBABWE: PRODUCTION OF MINERAL COMMODITIES 1/

e/ Estimated. r/ Revised.

1/ Table includes data available through July 4, 1996.

2/ Reported figure.

3/ "Mine output" figures are calculated from "metal" figures. "Metal" may include metal content of compounds/salts and may include cobalt recovered from nickel-copper matte imported from Botswana for toll refining.

4/ May include nickel content of nickel oxide.

5/ Includes rough and ground quartz as well as silica sand.

6/ Data represent output by the Wankie Colliery Co. Ltd.; additional output by the Redcliff plant of Zisco Ltd. may total 250,000 metric tons per year of metallurgical coke and coke breeze.

TABLE 2  
ZIMBABWE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995

(Thousand metric tons unless otherwise specified)

Commodity		Major operating companies and major equity owners	Location of main facilities	Annual capacity
Asbestos		Shabanie and Mashaba Mines (Pvt.) Ltd. [African Associated Mines (Pvt.) Ltd., 100%]	Shabanie Mine, Zvishavane; Gaths and King Mines, Mashava	300
Chromite, gross weight		Zimbabwe Mining and Smelting Co. (Pvt.) Ltd. (Zimasco) (Union Carbide Zimbabwe, 100%)	Peak Mine and Railway Block Mine at Shurugui and mines at Mutorshanga and Lalapanzi	200
Do.		Zimbabwe Alloys Ltd. (Zimalloys) (Anglo American Corp., 100%)	Great Dyke Mine, Mutoroshanga; Netherburn Mine at Lalapanzi; and Inyala Mine at Mberengwa	30
Coal		Wankie Colliery Co. Ltd. (private investors, 60%, Government, 40%)	Hwange	5,000
Cobalt	tons	Bindura Nickel Corp. (Anglo American Corp., 100%)	Shangani Mine, northwest of Shangani; Madziwa Mine, 50 kilometers northeast of Bindura; Trojan Mine, Bindura; Epoch Mine, Filabusi	150
Copper		Mhangura Copper Mines Ltd. (Zimbabwe Mining Development Corp. (ZMDC), 54.56%)	Mhangura	16
Do.		Munyati Mining Co. (Reunion Mining Plc., 75%; ZMDC, 25%)	Sanyati Mine, Sanyati	5
Do.		Lomagundi Smelting & Mining (Pvt.) Ltd. (ZMDC)	Smelter at Alaska	35
Do.		do.	Refinery at Alaska	28
Diamond	carats	Auridam Zimbabwe Ltd. (Auridam Consolidated NL, 50%; Redaurum Red Lake Mines Ltd., 50%)	River Ranch Mine, near Beitbridge	250,000
Gold	kilograms	Rio Tinto Zimbabwe Ltd. (RTZ Corp. plc., 56%)	Renco Mine, 75 kilometers southeast of Masvingo; Patchway Mine, Kadoma; Brompton Mine, Kadoma; and Cam and Motor dump, Kadoma	2,800
Do.	do.	Cluff Resources Zimbabwe Ltd. (Cluff Resources Plc., 82.4%, private investors, 17.6%)	Freda Rebecca Mine, Bindura	2,500
Do.	do.	Independence Mining (Pvt.) Ltd. (Lonhro Plc., 100%)	How Mine, Bulawayo; Athens Mine, Mvuma; Tiger Reef Mine, Kwekwe; Redwing Mine, Penhalonga; Shamva Mine, Shamva; Legion Dump, Kezi	3,300
Do.	do.	Falcon Gold Zimbabwe Ltd. (Falcon Investments S.A., 71.7%)	Dalny Mine, Chegutu; Venice Mine, Kadoma; Golden Quarry Mine, Shurugui; Old Nic Mine, Bulawayo; Antelope Mine, 1/ Kezi	2,100
Do.	do.	Corsyn Consolidated Mines (Pvt.) Ltd. (Lonrho Plc., 100%)	Anzac Mine, Kwekwe; Arcturus Mine, Arcturus; Mazowe Mine, Mazowe; Muriel Mine, Mutorshanga	1,500
Do.	do.	ZMDC (Government, 100%)	Lexington Mine and Elvington Gold Mine, near Chegutu	1,000
Do.	do.	Jena Mines Ltd. [ZMDC, 50%; Trillion Resources (Pvt.) Ltd. Zimbabwe, 50%]	Jena Group, Kwekwe area	400
Do.	do.	Masasa Mines (Delta Gold NL, 100%)	Giant tailings dump, near Chegutu	100
Do.	do.	Guyana Gold Corp. (55%) and ZMDC (45%)	Sabi Mine, south of Zvishavane	50
<b>Iron and steel:</b>				
Crude steel		Zimbabwe Iron and Steel Co. (Zisco) (Government, 92%)	Redcliff, near Gweru	220 2/
Iron ore, gross weight		Buchwa Iron Mining Co (Zisco, 100%)	Buchwa West Mine, Buchwa; Ripple Creek Mine, near Redcliff	1,400
<b>Ferroalloys:</b>				
Ferrochromium, high-carbon		Zimbabwe Mining and Smelting Co. (Pvt) Ltd. (Zimasco) (Union Carbide Zimbabwe, 100%)	Smelter at Kwekwe	220
Ferrochromium, low-carbon		Zimbabwe Alloys Ltd. (Zimalloys) (Anglo American Corp., 100%)	Smelter at Gweru	40
Ferrochromium-silicon		do.	do.	55
Lithium		Bikita Minerals (Pvt.) Ltd. (private, 100%)	Bikita Mine, 60 kilometers east of Masvingo	33
Nickel		Trojan Nickel Mines (Bindura Nickel Corp., 100%)	Shangani, Madziwa, Trojan, and Epoch Mines	17
Do.		Bindura Smelter & Refinery Ltd. (Bindura Nickel Corp., 100%)	Smelter and refinery at Bindura	16
Do.		Rio Tinto Zimbabwe Ltd.	Empress Nickel Refinery, Eiffel Flats, northeast of Kadoma	11

See footnotes at end of table.

TABLE 2-Continued  
 ZIMBABWE: STRUCTURE OF THE MINERAL INDUSTRY FOR 1995

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies and major equity owners	Location of main facilities	Annual capacity
Phosphate	Dorowa Minerals (Pvt.) Ltd. (Chemplex Corp. Ltd., 100%)	Dorowa Mine, 90 kilometers west of Mutare	155
Vermiculite	Shawa Vermiculite (Pvt.) Ltd. (private, 100%)	Shawa Mine, near Dorowa	39
Do.	Dinidza Vermiculite Mining Co. (Pvt.) Ltd. (private, 100%)	Dinidza Mine, near Dorowa	10

1/ Antelope property was optioned by Casmyn Corp. during 1995.

2/ Blast furnace No. 4 (capacity: 780,000 metric tons per year) remained shut in 1995.